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Kim et al.

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(54) **REFRIGERATOR**

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(22) Filed: **Jan. 3, 2013**

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(30) **Foreign Application Priority Data**

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(51) **Int. Cl.**

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F25C 1/04	(2006.01)
F25C 5/18	(2006.01)
F25C 5/04	(2006.01)

(52) **U.S. Cl.**

CPC ... ***F25C 5/16*** (2013.01); ***F25C 1/04*** (2013.01); ***F25C 5/046*** (2013.01); ***F25C 5/182*** (2013.01); *F25C 2400/10* (2013.01)

(58) **Field of Classification Search**

CPC F25C 1/04; F25C 5/16; F25C 5/046; F25C 5/182; F25C 2400/10

USPC 62/320, 340, 344, 354, 381

See application file for complete search history.

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(57) **ABSTRACT**

A structure of an ice making compartment of a refrigerator capable of enlarging the volume of a storage compartment by reducing a width of an ice making compartment, and capable of easily discharging the whole ice separately from pieces of ice, the refrigerator including an opening/closing member configured to open and close a portion of a discharge hole and having a cover portion to prevent the whole ice from being discharged in a state that the portion of the discharge hole is closed, the refrigerator including an opening/closing member integrally formed with a fixed blade configured to crush ice in cooperation with a rotary blade.

19 Claims, 9 Drawing Sheets

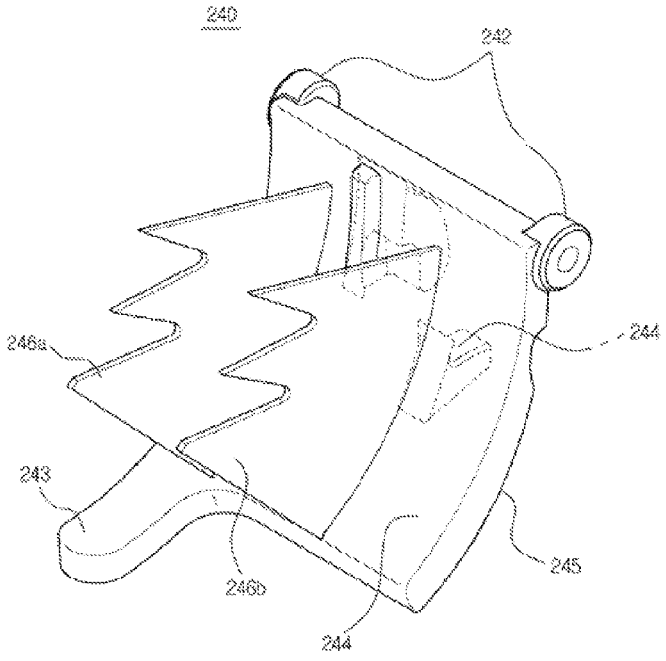


FIG. 1

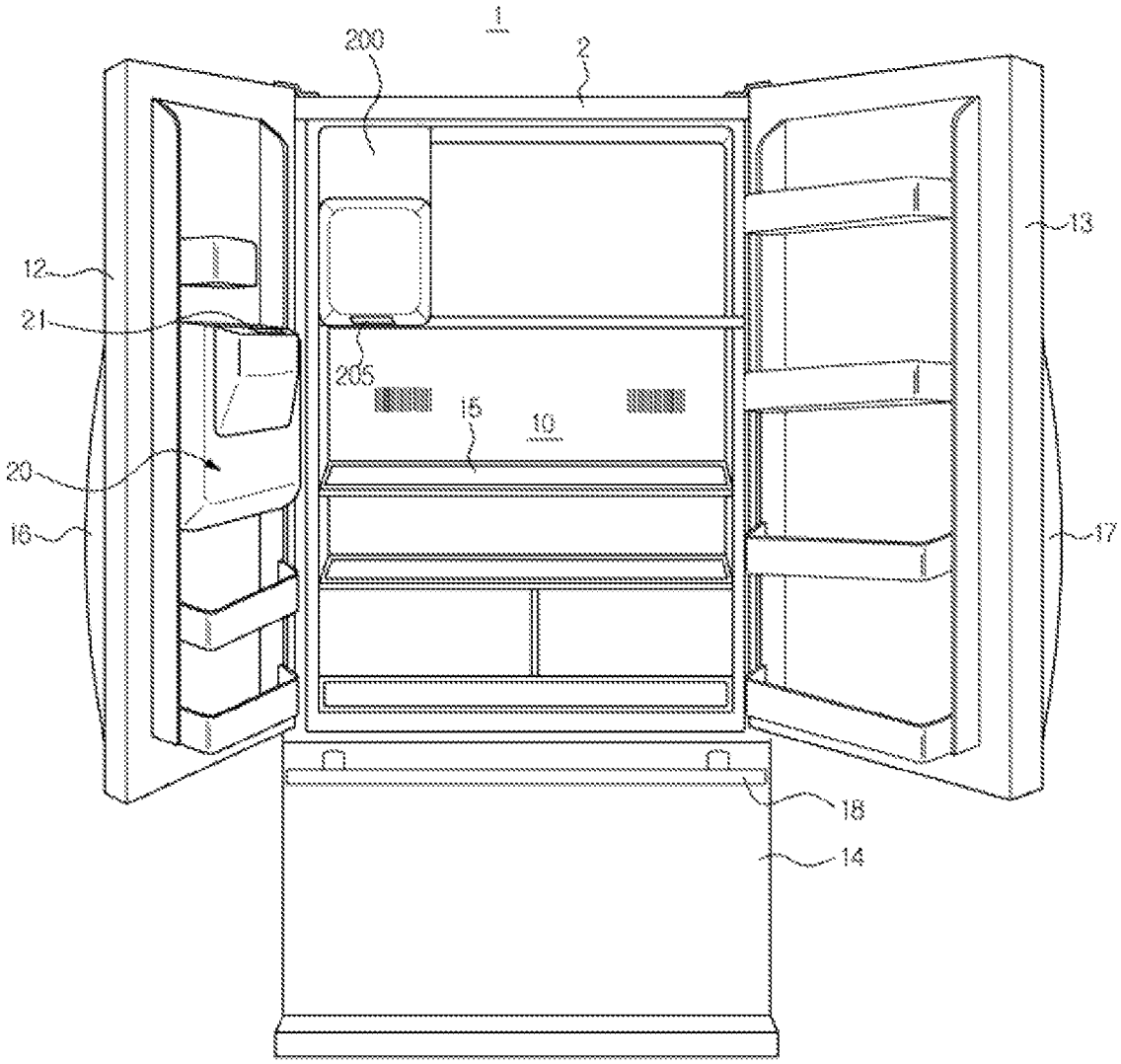


FIG. 2

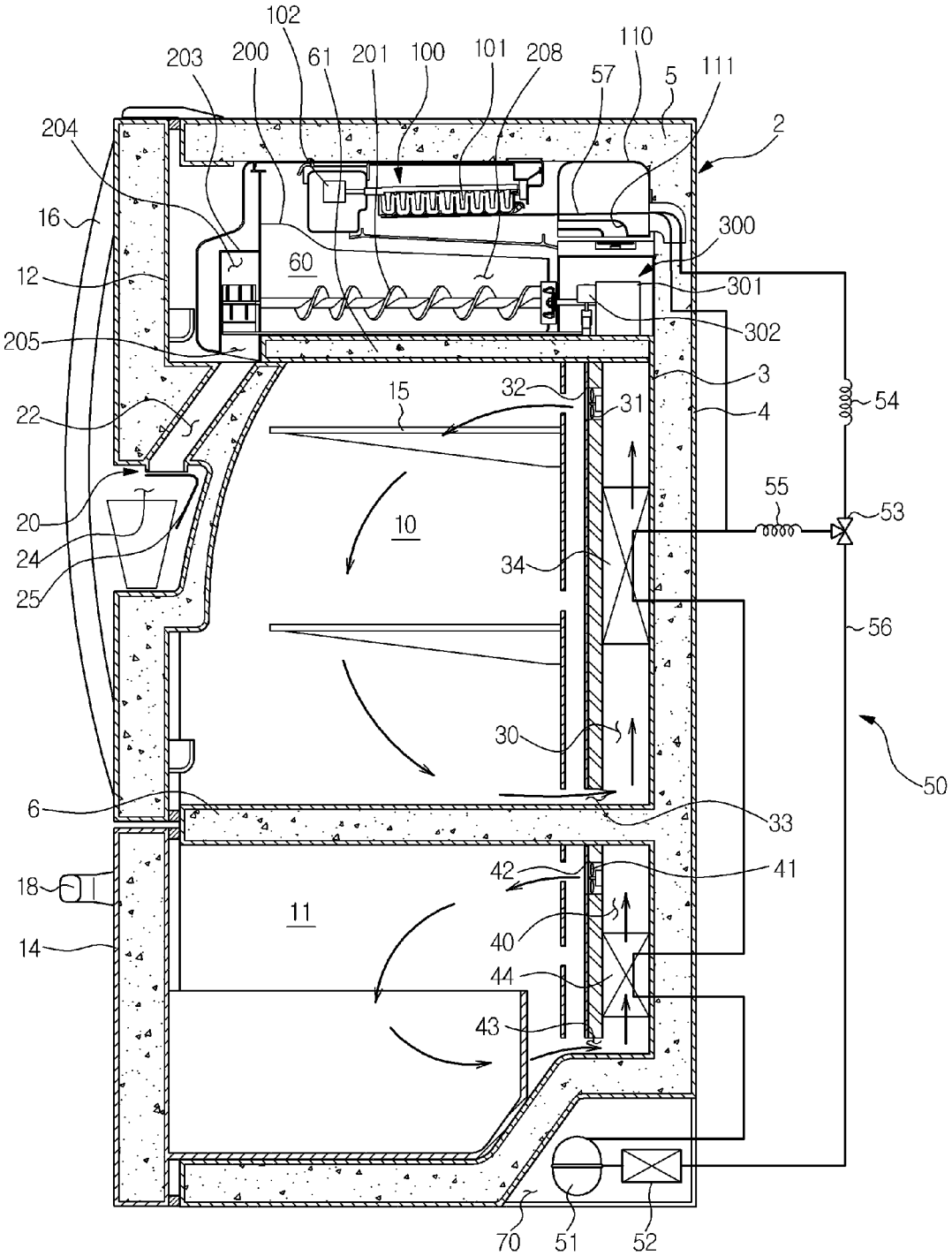

102
203
200
61
201
100
101
208
57
110
5
111
204
2
16
300
60
12
301
205
302
3
15
32
31
4
54
22
55
53
20
10
34
24
25
56
30
50
6
33
42
41
18
11
40
14
44
43
70
51
52

FIG. 3

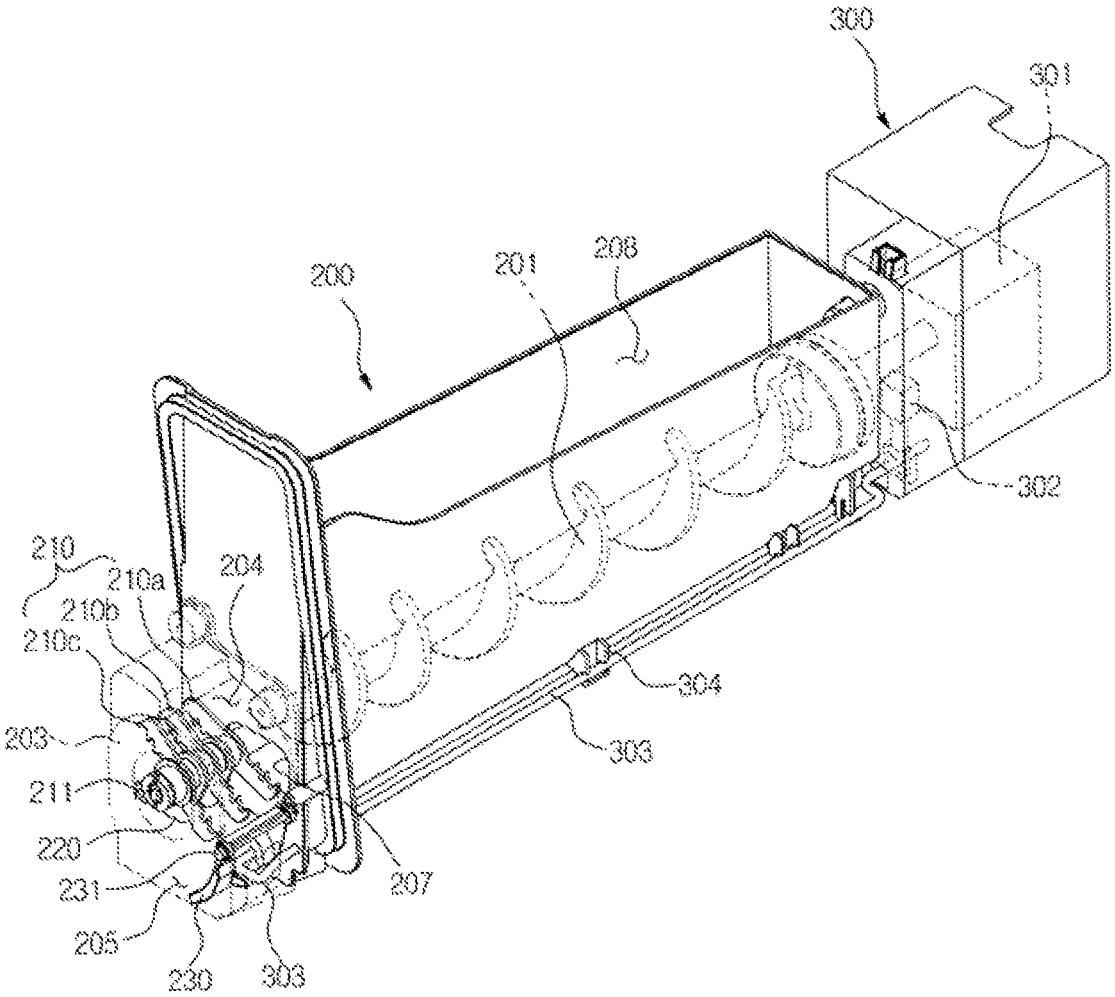

300
301
200
201
208
302
210
210a
210b
210c
204
203
211
220
231
205
230
303
304
207

FIG. 4

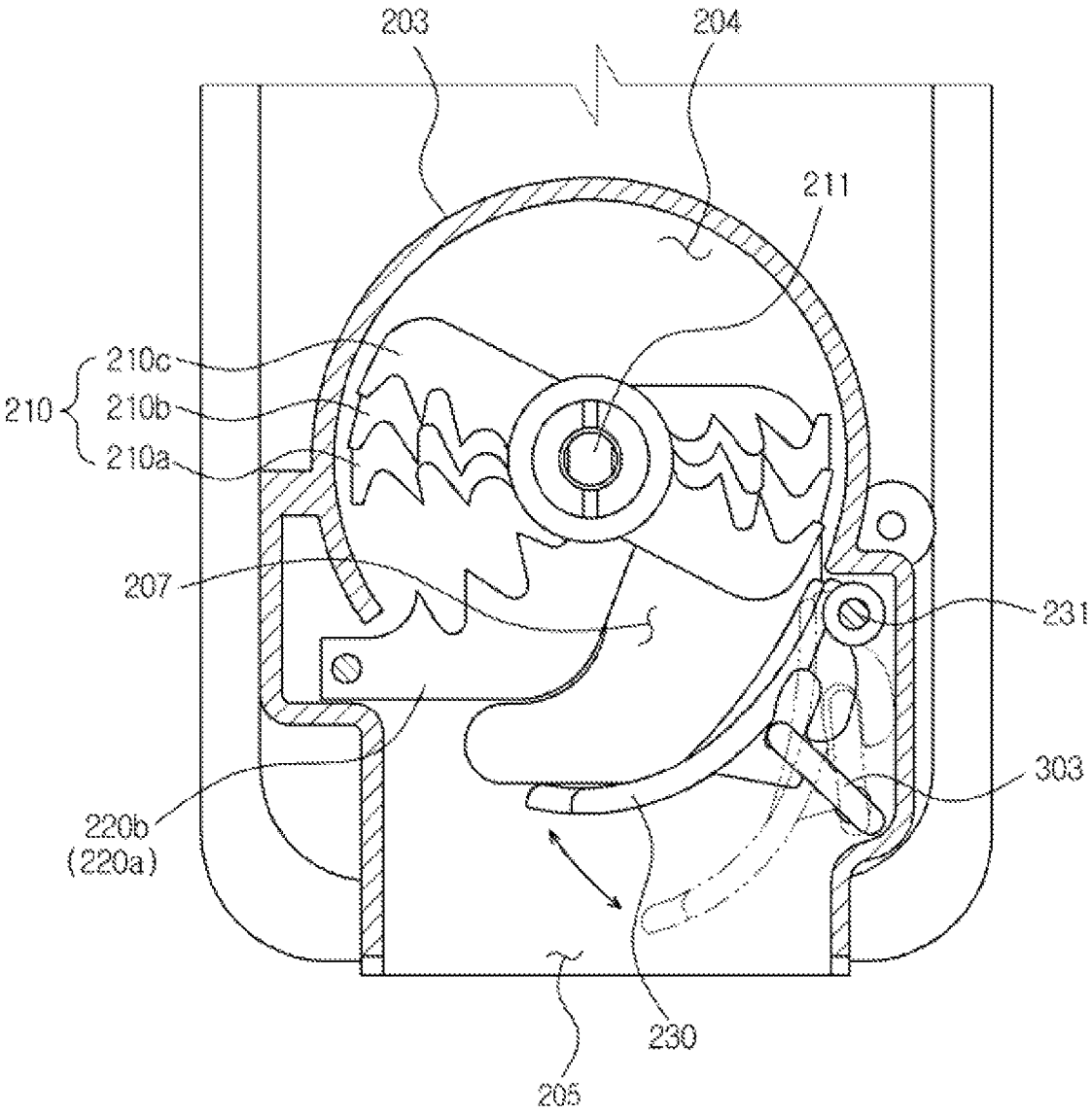


FIG. 5

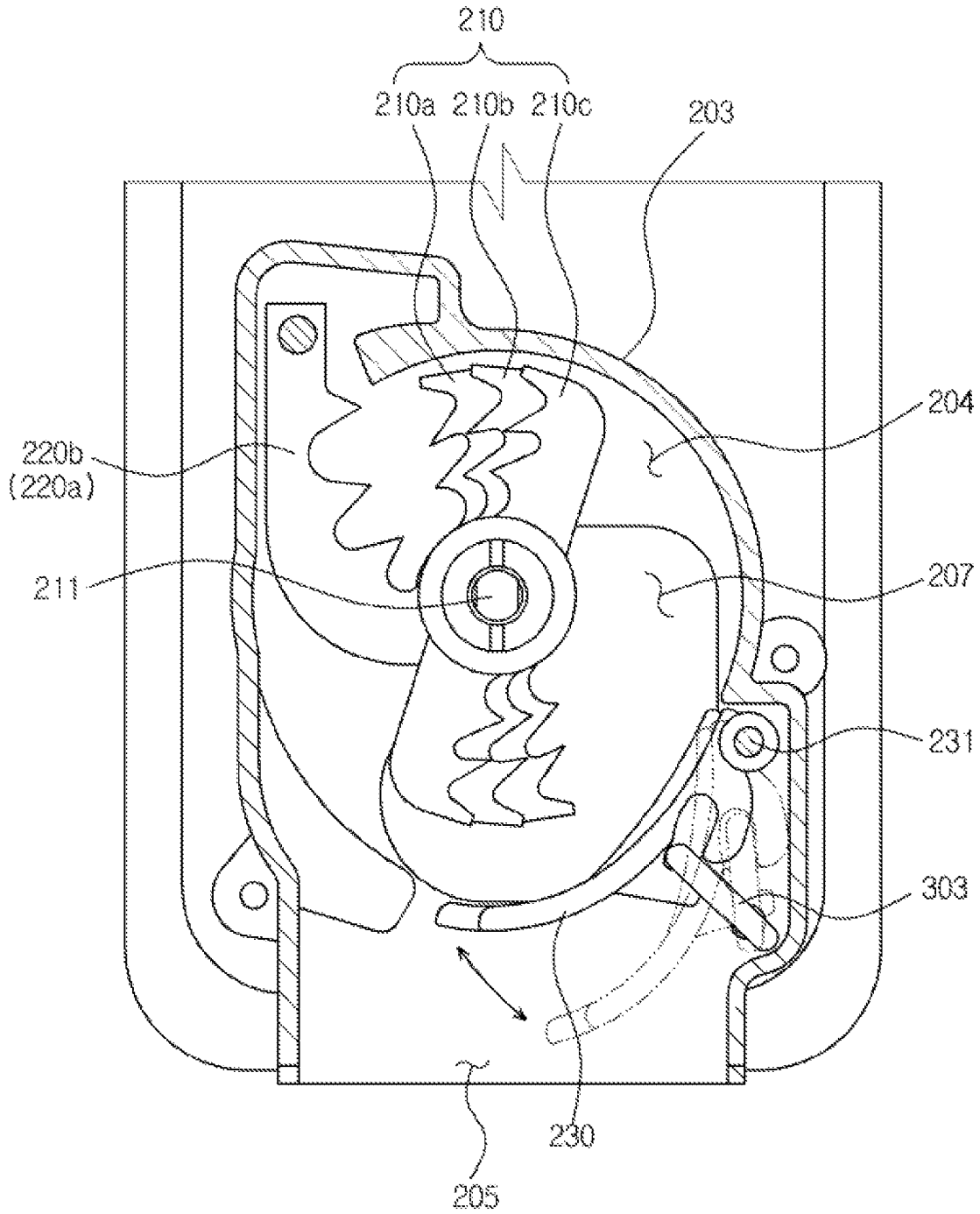


FIG. 6

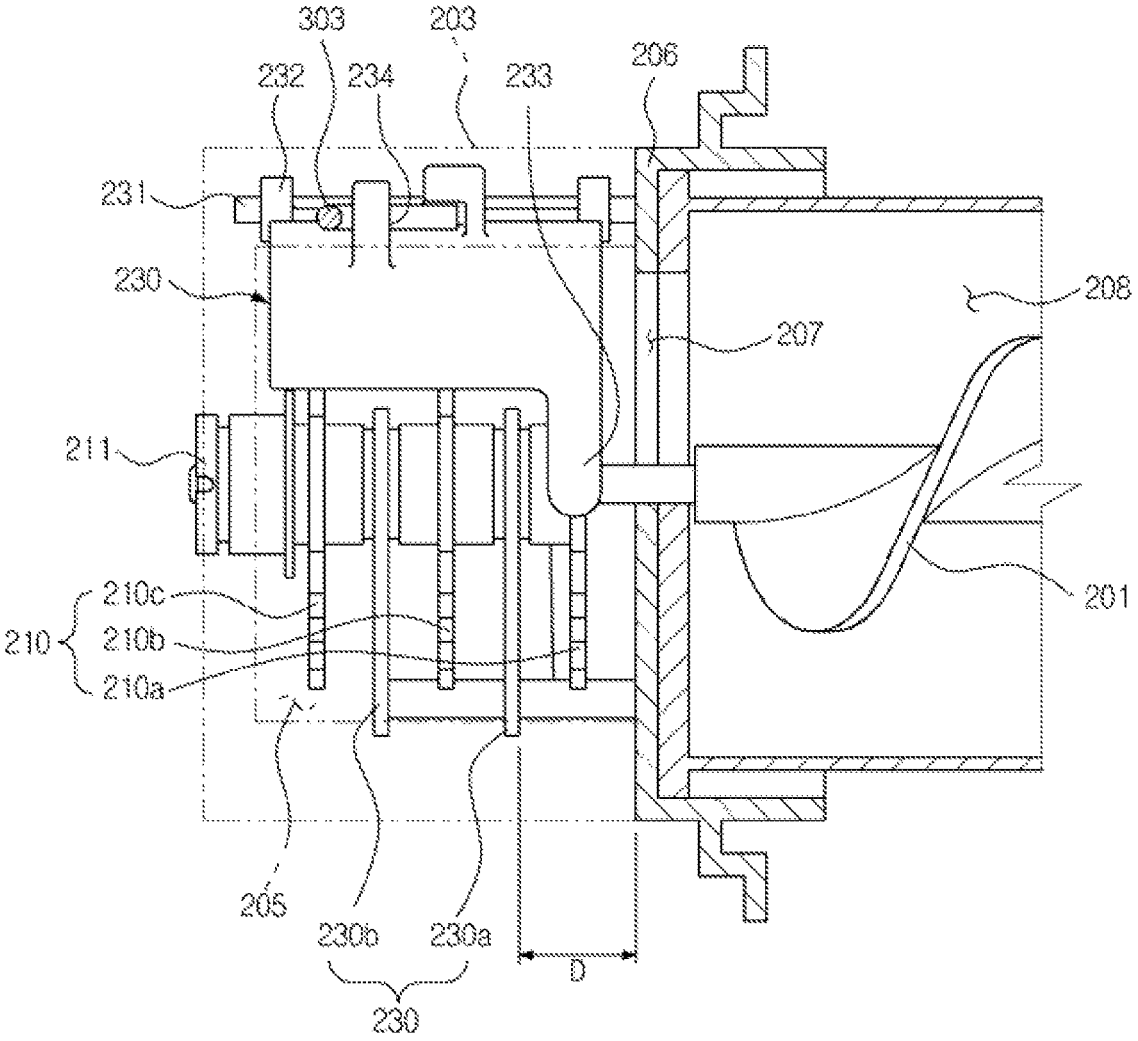

303
203
232
234
233
206
231
230
208
207
211
210c
210
210b
210a
201
205
230b
230a
D
230

FIG. 7

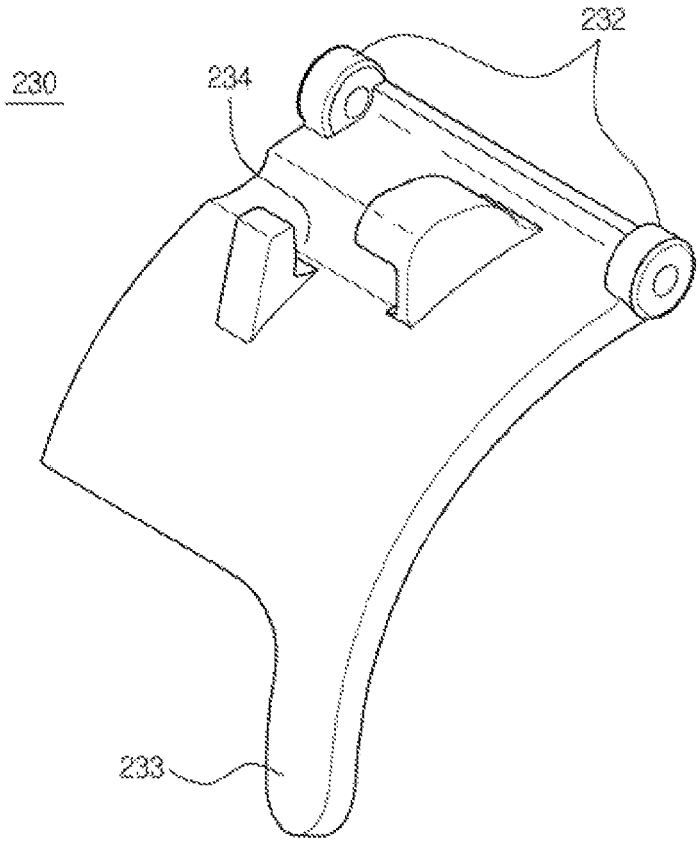


FIG. 8

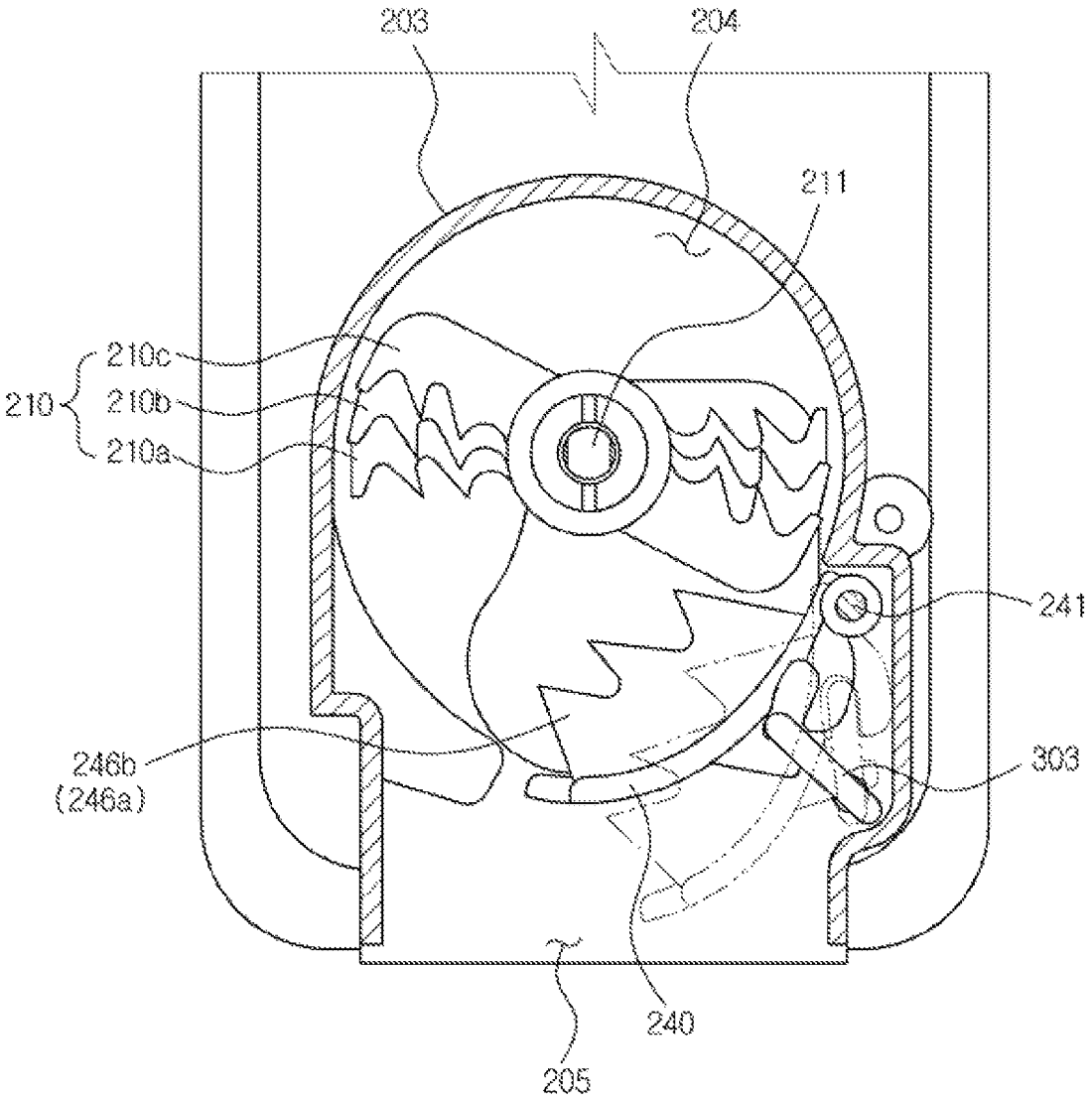
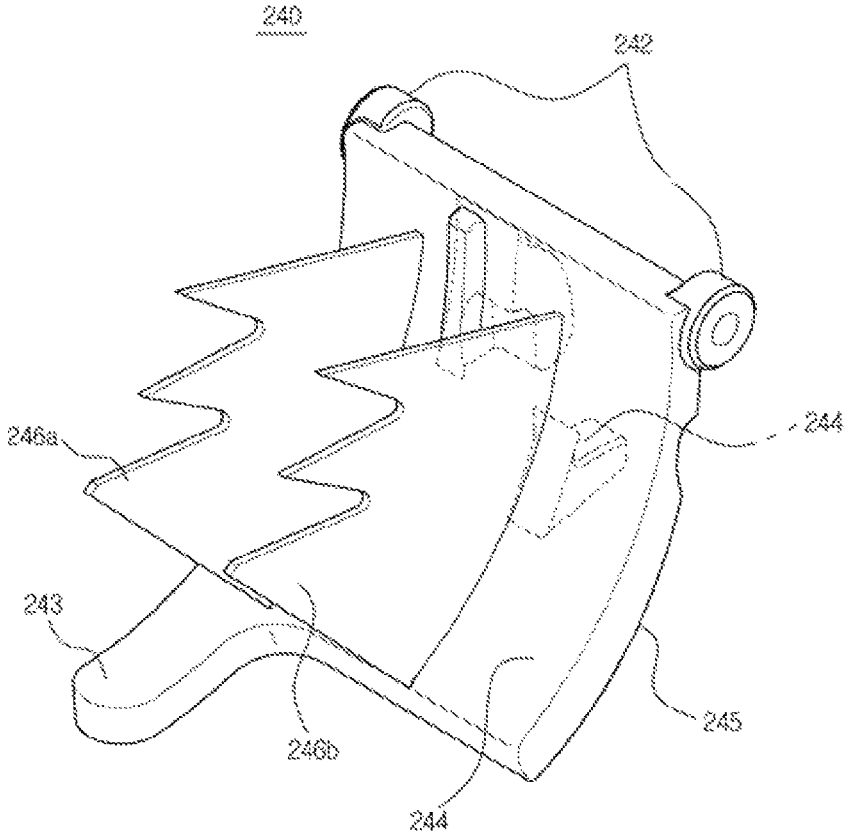


FIG. 9



REFRIGERATOR

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of Korean Patent Application No. 10-2012-0002141, filed on Jan. 6, 2012 in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

BACKGROUND

1. Field

Embodiments of the present disclosure relate to a structure of an ice crusher apparatus being installed on an ice bucket of an ice making compartment.

2. Description of the Related Art

In general, a refrigerator refers to a home appliance provided with a storage compartment configured to store foods and a cool air supply apparatus configured to supply the storage compartment with cool air to keep the foods fresh. The refrigerator may be provided with an ice maker to generate ice and an ice bucket to store the ice generated at the ice maker.

In addition, the ice bucket includes an ice crusher apparatus to crush ice, and an ice crushing space provided with a lower portion having a discharge hole. The ice crusher apparatus includes at least one fixed blade, at least one rotary blade, and an opening/closing member to open and close at least one portion of the discharge hole to select whether the ice is to be crushed.

That is, when the opening/closing member closes at least one portion of the discharge hole, the whole ice generated from the ice maker fails to pass through the discharge hole and is crushed by the fixed blade and the rotary blade. Accordingly, the crushed pieces of ice are discharged through the discharge hole. On the contrary, when the opening/closing member opens the discharge hole, the whole ice generated from the ice maker passes through the discharge hole as it is.

However, in a case that an ice making compartment has a narrow width, an opening angle of the opening/closing member is decreased, thereby making it difficult to selectively discharge the whole ice and the crushed ice.

SUMMARY

Therefore, it is an aspect of the present disclosure to provide a structure of an ice making compartment capable of enlarging the volume of a storage compartment by reducing a width of the ice making compartment.

It is another aspect of the present disclosure to provide a structure of an ice crusher apparatus capable of selectively discharging the whole ice generated from an ice maker and pieces of ice crushed through an ice crusher apparatus in an easy manner.

Additional aspects of the disclosure will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the disclosure.

In accordance with one aspect of the present disclosure, a refrigerator includes an ice maker, an ice bucket, an auger, at least one rotary blade, at least one fixed blade, and an opening/closing member. The ice maker may be configured to generate ice. The ice bucket may include an ice storage space configured to store the ice being generated from the ice maker, and an ice crushing space formed at a front of the ice storage space, the ice crushing space provided with a lower portion having a discharge hole. The auger may be configured to deliver the ice stored in the ice storage space to the ice crushing space. The at least one rotary blade may be coupled to the auger so as to rotate together with the auger. The at least one fixed blade may be configured to crush ice in cooperation with the at least one rotary blade. The opening/closing member may be configured to rotate on a hinge shaft, and configured to close a portion of the discharge hole to discharge ice being crushed or open the discharge hole to discharge uncrushed ice. The opening/closing member may include a cover portion protruding from one end of the opening/closing member to prevent the uncrushed ice from being discharged through the discharge hole in a state that the opening/closing member closes the portion of the discharge hole.

The cover portion may be located at a region between the ice storage space and a fixed blade, disposed at a nearest position to the ice storage space, among the at least one fixed blade.

A fixed blade, disposed at a nearest position to the ice storage space, among the at least one fixed blade may be spaced apart from the ice storage space by a predetermined interval to discharge the uncrushed ice through the discharge hole in a state the opening/closing member opens the discharge hole.

A hinge shaft accommodating portion may be formed at the other end of the opening/closing member to accommodate the hinge shaft.

The hinge shaft of the opening/closing member may be positioned at a lateral lower side of a rotary shaft of the at least one rotary blade.

One end of each of the at least one fixed blade may be positioned on the rotary shaft of the at least one rotary blade and the other end of each of the at least one fixed blade may be positioned at a lateral upper side of the rotary shaft of the at least one rotary blade.

The refrigerator may further include an auger and a solenoid driving apparatus. The auger motor may be configured to drive the auger. The solenoid driving apparatus may be configured to drive the opening/closing member. The solenoid driving apparatus may be disposed at a front of the auger motor.

In accordance with another aspect of the present disclosure, a refrigerator includes an ice maker, an ice bucket, an auger, at least one rotary blade, and an opening/closing member. The ice maker may be configured to generate ice. The ice bucket may include an ice storage space configured to store the ice being generated from the ice maker, and an ice crushing space formed at a front of the ice storage space, the ice crushing space provided with a lower portion having a discharge hole. The auger may be configured to deliver the ice stored in the ice storage space to the ice crushing space. The at least one rotary blade may be coupled to the auger so as to rotate together with the auger. The opening/closing member may be configured to rotate on a hinge shaft so as to open and close a portion of the discharge hole. The opening/closing member may include at least one fixed blade configured to crush ice in cooperation with the at least one rotary blade. The at least one fixed blade may be integrally formed with the opening/closing member.

The opening/closing member may include a first surface formed in a concave manner to support the ice, and a second surface formed at an opposite side to the first surface in a convex manner. The at least one fixed blade may protrude from the first surface.

The at least one fixed blade may be configured to crush ice in cooperation with the at least one rotary blade in a state that the opening/closing member closes the portion of the discharge hole.

The opening/closing member may include a cover portion protruding from one end of the opening/closing member to prevent uncrushed ice from being discharged through the discharge hole in a state that the opening/closing member closes the portion of the discharge hole.

A hinge shaft accommodating portion may be formed at the other end of the opening/closing member to accommodate the hinge shaft.

The hinge shaft of the opening/closing member may be positioned at a lateral lower side of a rotary shaft of the at least one rotary blade.

The refrigerator may further include an auger motor and a solenoid driving apparatus. The auger motor may be configured to drive the auger. The solenoid driving apparatus may be configured to drive the opening/closing member. The solenoid driving apparatus may be disposed at a front of the auger motor.

In accordance with another aspect of the present disclosure, a refrigerator includes a body, a storage compartment, an ice making compartment, a cool air supply apparatus, an ice making tray, an ice bucket, an auger, at least one rotary bade, at least one fixed blade, an opening/closing member, and a solenoid driving apparatus. The storage compartment may be formed at an inside the body. The ice making compartment may be configured to be partitioned from the storage compartment at the inside the body. The cool air supply apparatus, in order to supply cool air, may include a compressor, a condenser, an expansion apparatus, an evaporator and a refrigerant pipe while having a portion of the refrigerant pipe disposed at the ice making compartment. The ice making tray may be configured to directly receive a cooling energy while making a contact with the refrigerant pipe of the ice making compartment. The ice bucket may include an ice storage space configured to store ice being separated from the ice making tray, and an ice crushing space formed at a front of the ice storage space, the ice crushing space provided with a lower portion having a discharge hole. The auger may be configured to deliver the ice stored in the ice storage space to the ice crushing space. The at least one rotary blade may be coupled to the auger to rotate together with the auger. The at least one fixed blade may be configured to crush ice in cooperation with the at least one rotary blade. The opening/closing member may be configured to rotate on a hinge shaft, and configured to close a portion of the discharge hole to discharge ice being crushed or open the discharge hole to discharge uncrushed ice. The solenoid driving apparatus may be configured to rotate the opening/closing member in connection with the opening/closing member. The opening/closing member may include a cover portion protruding from one end of the opening/closing member to prevent the uncrushed ice from being discharged through the discharge hole in a state that the opening/closing member closes the portion of the discharge hole. The hinge shaft of the opening/closing member may be positioned at a lateral lower side of a rotary shaft of the at least one rotary blade. The solenoid driving apparatus may be disposed at a front of an auger motor configured to drive the auger.

As described above, according to the embodiments of the present disclosure, the width of the ice making compartment is reduced, so that the volume of the storage compartment is enlarged.

In addition, even if the width of the ice making compartment is reduced, the selective discharge between the whole ice and the pieces of ice is achieved in an easy manner.

BRIEF DESCRIPTION OF THE DRAWINGS

These and/or other aspects of the disclosure will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

FIG. **1** is a front view illustrating a refrigerator in accordance with the first embodiment of the present disclosure.

FIG. **2** is a cross sectional view illustrating the refrigerator of FIG. **1**.

FIG. **3** is a perspective view illustrating components of an ice bucket and an ice crusher apparatus of the refrigerator of FIG. **1**.

FIG. **4** is a front view illustrating components of the ice crusher apparatus of the refrigerator of FIG. **1**.

FIG. **5** is a cross sectional view illustrating components of an ice crusher apparatus in accordance with the second embodiment of the present disclosure.

FIG. **6** is a cross sectional view illustrating components of an ice crusher apparatus in accordance with the third embodiment of the present disclosure.

FIG. **7** is a view illustrating an opening/closing member of the refrigerator of FIG. **6**.

FIG. **8** is a front view illustrating components of an ice crusher apparatus in accordance with the fourth embodiment of the present disclosure.

FIG. **9** is a view illustrating an opening/closing member of the refrigerator of FIG. **8**.

DETAILED DESCRIPTION

Reference will now be made in detail to the embodiments of the present disclosure, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to like elements throughout.

FIG. **1** is a front view illustrating a refrigerator in accordance with the first embodiment of the present disclosure. FIG. **2** is a cross sectional view illustrating the refrigerator of FIG. **1**. FIG. **3** is a perspective view illustrating components of an ice bucket and an ice crusher apparatus of the refrigerator of FIG. **1**. FIG. **4** is a front view illustrating components of the ice crusher apparatus of the refrigerator of FIG. **1**. FIG. **5** is a cross sectional view illustrating components of an ice crusher apparatus in accordance with the second embodiment of the present disclosure.

Referring to FIGS. **1** and **2**, a refrigerator **1** includes a body **2**, storage compartments **10** and **11** to keep food frozen or cooled, an ice making compartment **60** to generate ice, and a cool air supply apparatus **50** to supply the ice making compartment **60** with cool air.

The body **2** includes an outer case **4** forming the external appearance of the body **2**, an inner case **3** forming the storage compartments **10** and **11**, and an insulation material **5** foamed between the outer case **4** and the inner case **3**.

The storage compartments **10** and **11** have front surfaces being open. The storage compartment **10** and **11** are divided by a horizontal partition wall **6** into a refrigerating compartment **10** and a freezing compartment **11** at the upper portion and the lower portion, respectively. The horizontal partition wall **6** may include insulation material to block the heat exchanged between the refrigerating compartment **10** and the freezing compartment **11**.

The refrigerating compartment **10** may be provided with a shelf **9** on which food is placed and which serves to partition a storage space of the refrigerating compartment **10** into an upper portion and a lower portion. The open front surface of the refrigerating compartment **10** may be open and closed by a pair of doors **12** and **13** that are hingedly coupled to the body **2** so as to enable rotation. Handles **16** and **17** are provided at the doors **12** and **13**, respectively, to open and close the doors **12** and **13**.

A dispenser **20** is provided at the doors **12** and **13** such that ice being generated from the ice making compartment **60** is taken out from the outside without opening the doors **12** and **13**. The dispenser **20** includes a take-out space **24** to take out ice, a lever **25** to select whether ice is to be taken out, and a chute **22** to guide the ice being discharged through an ice withdrawal hole **21** which is adjacent to an ice discharge hole **205** of an ice bucket **200**, which is to be described later, toward the take-out space **24**.

The open front surface of the freezing compartment **11** may be open and closed by a sliding door **14** available to be inserted into the freezing compartment **11** in a sliding manner. A rear surface of the sliding door **14** is integrally formed with a storage box on which food is contained. The sliding door **14** is provided with a handle **18** to open and close the sliding door **14**.

Referring to FIG. **2**, the refrigerator **1** includes the cool air supply apparatus **50** configured to supply the storage compartments **10** and **11** and the ice making compartment **60** with cool air. The cool air supply apparatus **50** includes a compressor **51** to compress refrigerant into a high pressure refrigerant, a condenser **52** to condense the compressed refrigerant, expansion apparatuses **54** and **55** to expand the refrigerant into a low pressure refrigerant for easy evaporation, evaporators **34** and **44** to generate cool air by evaporating the refrigerant, and a refrigerant pipe **56** to guide the refrigerant.

The compressor **51** and the condenser **52** are disposed at a machine room **70** being provided at a lower portion of a rear side of the body **2**. In addition, the evaporators **34** and **44** are disposed at a refrigerating compartment cool air supply duct **30** provided at the refrigerating compartment **10** and at a freezing compartment cool air supply duct **40** provided at the freezing compartment **11**. Accordingly, the refrigerating compartment **10** and the freezing compartment **11** may be cooled independent of each other.

The refrigerating compartment cool air supply duct **30** includes a suction port **33**, a cool air discharge port **32**, and a blower fan **31**, to circulate the cool air at the inside the refrigerating compartment **10**. In addition, the freezing compartment coo air supply duct **40** includes a suction port **43**, a cool air discharge port **42** and a blower fan **41**, to circulate the cool air at the inside the freezing compartment **11**.

Meanwhile, a portion of the refrigerant pipe **56** is disposed to be extended to the inside the ice making compartment **60** to cool the ice making compartment **60**.

The refrigerant pipe **56** is diverged at one point thereof such that a refrigerant flows to the ice making compartment **60**, the refrigerating compartment **10** and the freezing compartment **11** in a sequential manner, or flows only to the refrigerating compartment **10** and the freezing compartment **11** except for the ice making compartment **60**. In addition, a switching valve **53** may be installed at the diverged portion of the refrigerant pipe **56** to switch the path of refrigerant. In addition, the refrigerant pipe **57** disposed at the inside the ice making compartment **60** makes a direct contact with an ice making tray **101** of an ice maker **100** to directly supply the cooling energy.

Meanwhile, the ice making compartment **60** is provided to be partitioned from the storage compartments **10** and **11** at the inside the body **2**. In addition, the ice making compartment **60** has a front surface configured to be open. The open front surface of the ice making compartment **60** is closed by an ice making compartment cover portion of the ice bucket.

The ice making compartment **60** is provided at an upper portion of one side of the refrigerating compartment **10** while being partitioned from the refrigerating compartment **10** by an ice making compartment wall **61**. The ice making compartment wall **61** may include insulation material to prevent heat exchange between the ice making compartment **60** and the refrigerating compartment **10**.

The ice making compartment **60** is provided with an automatic ice making assembly to generate ice. The automatic ice making assembly includes a refrigerant pipe fixing duct **110**, which is configured to fix the refrigerant pipe **57** and form a portion of the cool air path at the inside the ice making compartment **60**, the ice maker **100** to generate ice, the ice bucket **200** to store the ice being generated from the ice maker **100**, and an auger motor **301** provided at a rear of the ice bucket **200** to drive the auger **201**.

In addition, a solenoid driving apparatus **302** is provided at a front of the auger motor **301** to rotate an opening/closing member **230** of an ice crusher apparatus that is to be described later. Accordingly, when compared to the conventional structure in which the auger motor is disposed at a lateral side of the solenoid driving apparatus, the ice making compartment **60** in accordance with the present disclosure has a slim width.

The ice making tray **101** includes a plurality of ice making cells, each of which has a cross section in an approximate semi-circular shape, so that the ice being generated from the ice making tray **101** is provided with a cross section in an approximate semi-circular shape. Hereinafter, the ice provided in a semi-circular shape is referred to as a whole ice. An ice separating motor **102** is configured to rotate the ice making tray **101** to deliver the whole ice to the ice bucket **200**.

The ice bucket **200** may further include an ice storage space **208** to store the ice, an ice crushing space **204** formed at a front of the ice storage space **208** to crush the ice, and an auger **201** to deliver the ice from the ice storage space **208** to the ice crushing space **204**.

The ice storage space **208** and the ice crushing space **204** are divided by a partition portion (**206** in FIG. **6**) from each other, and ice is delivered from the ice storage space **208** to the ice crushing space **204** through a communicating portion (**207** in FIG. **6**) that is formed at the partition portion **206**. The ice crushing space **204** is formed by the partition portion **206** and a cover (**203** in FIG. **2**) coupled at a front surface of the partition portion **206**.

The ice crushing space **204** is provided with a crusher apparatus to crush the whole ice being generated from the ice maker **100**. Hereinafter, the ice being crushed by the crusher apparatus is referred to as pieces of ice.

The crusher apparatus includes at least one rotary blade **210**, at least one fixed blade **220**, and the opening/closing member **230** to open and close a portion of the discharge hole **205** formed at the lower portion of the ice crushing space **204**. The at least one fixed blade **220** is provided in a number that is one less than the at least one rotary blade **210** while being disposed between the rotary blades **210**. As one example, the at least one fixed blade may be provided in two units of fixed blades **220***a* and **220***b*, and the at least one rotary blade may be provided in three units of rotary blades **210***a*, **210***b*, and **210***c*.

The rotary blade **210** is configured to radially protrude from a rotary shaft **211** of the auger **201**. In addition, the rotary blade **210** is configured to rotate together with the auger **201**.

Meanwhile, the opening/closing member **230** may be hingedly coupled between the cover **203** and the partition portion **206**. A hinge shaft accommodating portion (**232** in FIG. **7**) may be provided at one end of the opening/closing member **230** to accommodate a hinge shaft.

In addition, the opening/closing member **230** may be connected to the solenoid driving apparatus **302** through a connection member **303**. The opening/closing member **230** is provided with a connection member accommodating portion **234** formed thereon to which the connection member **303** is connected. The translation motion of the connection member **303** is limited by a clamping apparatus **304** fixed to the ice bucket **300**.

Accordingly, as the solenoid driving apparatus **302** moves up and down, the connection member **303** performs a rotary motion, and as a result, the opening/closing member **230** connected to the connection member **303** is rotated on a rotary shaft **231** to open and close a portion of the discharge hole **205**.

When the opening/closing member **230** closes a portion of the discharge hole **205**, the whole ice being generated from the ice maker **100** is stuck between the discharge hole **205** and the opening/closing member **230** and is prevented from being discharged through the discharge hole **205**. In this case, when the rotary blade **210** is rotated, the ice is crushed while being stuck between the rotary blade **210** and the fixed blade **220**. The pieces of ice crushed are discharged through the discharge hole **205**.

Referring to FIGS. **4** and **5**, the rotary shaft **231** of the opening/closing member **230** is disposed at a lateral lower side of the rotary shaft **211** of the rotary blade **210** such that an opening angle of the opening/closing member **302** is increased.

As shown in FIG. **4**, one end of each of the fixed blades **220***a* and **220***b* is disposed on the rotary shaft **211** of the rotary blade **210**, and the other end of each of the fixed blades **220***a* and **220***b* is disposed at a lateral lower side of the rotary shaft **211** of the rotary blade **210**. As shown in FIG. **5**, one end of each of the fixed blades **220***a* and **220***b* is disposed on the rotary shaft **211** of the rotary blade **210**, and the other end of each of the fixed blades **220***a* and **220***b* is disposed at a lateral upper side of the rotary shaft **211** of the rotary blade **210**.

Referring to FIG. **5**, when one end of each of the fixed blades **220***a* and **220***b* is disposed on the rotary shaft **211** of the rotary blade **210**, and the other end of each of the fixed blades **220***a* and **220***b* is disposed at a lateral upper side of the rotary shaft **211** of the rotary blade **210**, even though the width of the ice making compartment **60** becomes narrower, the ice is easily discharged through the discharge hole **205** without being stuck at the fixed blades **220***a* and **220***b*. In addition, the opening angle of the opening/closing member **230** is designed to be larger.

FIG. **6** is a cross sectional view illustrating components of an ice crusher apparatus in accordance with the third embodiment of the present disclosure. FIG. **7** is a view illustrating an opening/closing member of the refrigerator of FIG. **6**. In the following description, the same reference numerals will be assigned to the parts of the present embodiment that are identical to those according to the previous embodiments, and details of parts will be omitted in order to avoid redundancy.

Referring to FIGS. **6** and **7**, in a refrigerator in accordance with the third embodiment of the present disclosure, a first fixed blade **230***a*, disposed at the nearest position to the ice storage space **208**, of the fixed blades **230***a* and **230***b* is spaced apart by a predetermined interval D from the partition portion **206** that is configured to partition the ice crushing space **204** from the ice storage space **208**, so as to prevent the whole ice from being stuck at the first fixed blade **230***a* and failing to be discharged in a state that the opening/closing member **230** opens the discharge hole **205**.

On the contrary, the opening/closing member **230** further includes a cover portion **233** configured such that the whole ice is prevented from being discharged through the discharge hole **205** in a state that the opening/closing member **230** closes a portion of the discharge hole **205**. In this case, the cover portion **233** is provided at an opposite end to the hinge shaft accommodating portion **232**.

By having the cover portion **233** disposed between the first fixed blade **230***a* and the ice storage space **208** as shown in FIG. **6**, the whole ice is prevented from being discharged through the discharge hole **205** via a gap between the first fixed blade **230***a* and the partition portion **206**.

FIG. **8** is a front view illustrating components of an ice crusher apparatus in accordance with the fourth embodiment of the present disclosure. FIG. **9** is a view illustrating an opening/closing member of the refrigerator of FIG. **8**. In the following description, the same reference numerals will be assigned to the parts of the present embodiment that are identical to those according to the previous embodiments, and details of parts will be omitted in order to avoid redundancy.

Different from the previous embodiments described above, a refrigerator in the fourth embodiment of the present disclosure has fixed blades **246***a* and **246***b* integrally formed with an opening/closing member **240**.

That is, the opening/closing member **240** is provided with the fixed blades **246***a* and **246***b* in addition to a shaft accommodating portion **242**, a cover portion **243** and a connection member accommodating portion **244**, so that the fixed blades **246***a* and **246***b* crush ice in cooperation with the rotary blade **210**.

The opening/closing member **240** includes a first surface **244** formed in a concave manner and a second surface **245** formed in a convex manner. The fixed blades **246***a* and **246***b* are formed on the first surface **244**, and the connection member accommodation portion **244** is formed on the second surface **245**.

Through the structure as such, the opening/closing member **240** crushes the ice in cooperation with the rotary blade **210** while opening/closing the discharge hole **205**.

Although a few embodiments of the present disclosure have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles and spirit of the disclosure, the scope of which is defined in the claims and their equivalents.

What is claimed is:

1. A refrigerator comprising:

an ice maker configured to make ice;

an ice bucket comprising an ice storage space configured to store the ice being made from the ice maker, and an ice crushing space provided with a lower portion having a discharge hole;

an auger configured to deliver the ice stored in the ice storage space to the ice crushing space;

at least one rotary blade coupled to the auger so as to rotate together with the auger;

at least one fixed blade configured to crush ice in cooperation with the at least one rotary blade; and

an opening/closing member configured to rotate on a hinge shaft, and configured to close a portion of the discharge

hole to discharge ice being crushed or open the discharge hole to discharge uncrushed ice,

wherein the opening/closing member comprises a cover portion protruding from one end of the opening/closing member to prevent the uncrushed ice from being discharged through the discharge hole in a state that the opening/closing member closes the portion of the discharge hole.

2. The refrigerator of claim **1**, wherein the cover portion is located at a region between the ice storage space and the at least one fixed blade, disposed at a nearest position to the ice storage space, among the at least one fixed blade.

3. The refrigerator of claim **1**, wherein the at least one fixed blade, disposed at a nearest position to the ice storage space, among the at least one fixed blade is spaced apart from the ice storage space by a predetermined interval to discharge the uncrushed ice through the discharge hole in a state the opening/closing member opens the discharge hole.

4. The refrigerator of claim **1**, wherein a hinge shaft accommodating portion is formed at another end of the opening/closing member to accommodate the hinge shaft.

5. The refrigerator of claim **1**, wherein the hinge shaft of the opening/closing member is positioned at a lateral lower side of a rotary shaft of the at least one rotary blade.

6. The refrigerator of claim **1**, wherein one end of each of the at least one fixed blade is positioned on a rotary shaft of the at least one rotary blade and the another end of each of the at least one fixed blade is positioned at a lateral upper side of the rotary shaft of the at least one rotary blade.

7. The refrigerator of claim **1**, further comprising:

an auger motor configured to drive the auger; and

a solenoid driving apparatus configured to drive the opening/closing member,

wherein the solenoid driving apparatus is disposed at a front of the auger motor.

8. A refrigerator comprising:

an ice maker configured to make ice;

an ice bucket comprising an ice storage space configured to store the ice being made from the ice maker, and an ice crushing space provided with a lower portion having a discharge hole;

an auger configured to deliver the ice stored in the ice storage space to the ice crushing space;

at least one rotary blade coupled to the auger so as to rotate together with the auger; and

an opening/closing member configured to rotate on a hinge shaft so as to open and close a portion of the discharge hole,

wherein the opening/closing member comprises at least one fixed blade configured to crush ice in cooperation with the at least one rotary blade, and

wherein the at least one fixed blade is integrally formed with the opening/closing member.

9. The refrigerator of claim **8**, wherein:

the opening/closing member comprises a first surface formed in a concave manner to support the ice, and a second surface formed at an opposite side to the first surface in a convex manner, and

the at least one fixed blade protrudes from the first surface.

10. The refrigerator of claim **8**, wherein the at least one fixed blade is configured to crush ice in cooperation with the at least one rotary blade in a state that the opening/closing member closes the portion of the discharge hole.

11. The refrigerator of claim **8**, wherein the opening/closing member comprises a cover portion protruding from one end of the opening/closing member to prevent uncrushed ice from being discharged through the discharge hole in a state that the opening/closing member closes the portion of the discharge hole.

12. The refrigerator of claim **11**, wherein a hinge shaft accommodating portion is formed at another end of the opening/closing member to accommodate the hinge shaft.

13. The refrigerator of claim **8**, wherein the hinge shaft of the opening/closing member is positioned at a lateral lower side of a rotary shaft of the at least one rotary blade.

14. The refrigerator of claim **8**, further comprising:

an auger motor configured to drive the auger; and

a solenoid driving apparatus configured to drive the opening/closing member,

wherein the solenoid driving apparatus is disposed at a front of the auger motor.

15. A refrigerator comprising:

a body;

a storage compartment formed inside the body;

an ice making compartment configured to be partitioned from the storage compartment inside the body;

a cool air supply apparatus, in order to supply cool air, comprising a compressor, a condenser, an expansion apparatus, an evaporator and a refrigerant pipe, a portion of the refrigerant pipe being disposed in the ice making compartment;

an ice making tray configured to directly receive a cooling energy while making a contact with the refrigerant pipe of the ice making compartment;

an ice bucket comprising an ice storage space configured to store ice being separated from the ice making tray, and an ice crushing space provided with a lower portion having a discharge hole;

an auger configured to deliver the ice stored in the ice storage space to the ice crushing space;

at least one rotary blade coupled to the auger to rotate together with the auger;

at least one fixed blade configured to crush ice in cooperation with the at least one rotary blade;

an opening/closing member configured to rotate on a hinge shaft, and configured to close a portion of the discharge hole to discharge ice being crushed or open the discharge hole to discharge uncrushed ice, and

a solenoid driving apparatus configured to rotate the opening/closing member,

wherein the opening/closing member comprises a cover portion protruding from one end of the opening/closing member to prevent the uncrushed ice from being discharged through the discharge hole in a state that the opening/closing member closes the portion of the discharge hole,

the hinge shaft of the opening/closing member is positioned at a lateral lower side of a rotary shaft of the at least one rotary blade, and

the solenoid driving apparatus is disposed at a front of an auger motor configured to drive the auger.

16. An ice maker for a refrigerator comprising:

an ice making tray;

an ice bucket to store ice made in the ice making tray, the ice bucket including an ice storing space and an ice crushing space having a discharge hole at a lower portion thereof;

an auger to deliver the ice from the ice storage space to the ice crushing space;

at least one rotary blade coupled to the auger so as to rotate together with the auger;

at least one fixed blade configured to crush the ice in cooperation with the at least one rotary blade; and

an opening/closing member configured to rotate on a hinge shaft, the opening/closing member includes a cover portion protruding from one end of the opening/closing member to only partially close a portion of the discharge hole in a closed position.

17. The ice maker of claim **16**, wherein the cover portion is located at a region between the ice storage space and the at least one fixed blade, disposed at a nearest position to the ice storage space, among the at least one fixed blade.

18. The ice maker of claim **17**, wherein the at least one fixed blade disposed at the nearest position to the ice storage space is spaced apart from the ice storage space by a predetermined interval to discharge uncrushed ice through the discharge hole when the opening/closing member is in an open position.

19. The ice maker of claim **16**, wherein one end of each of the at least one fixed blade is positioned on a rotary shaft of the at least one rotary blade and the other end of each of the at least one fixed blade is positioned at a lateral upper side of the rotary shaft of the at least one rotary blade.

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